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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/935,440	08/22/2001	William Bruckert	20206-20 (P00-3334)	9046

7590 12/10/2004

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EXAMINER	
KWON, MIN S	

ART UNIT	PAPER NUMBER
2142	

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/935,440	BRUCKERT ET AL.	
	Examiner	Art Unit	
	Min S. Kwon	2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/16/2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7 and 12* is/are allowed.

6)☒ Claim(s) *1-6,8-11 and 13-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 4/02 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *08/19/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-40 have been examined.

Priority

2. Acknowledgment is made of applicant's claim for priority. The application claims the benefits of U.S. Provisional Application No. 60/227,899 filed August 25, 2000.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-8, 9-12, 13, 21- 24, 26-32 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent Number 5,856,974 to Gervais et al.

   a. As to claims 1, 22, 26 and 28, Gervais teaches a scalable clustered system, comprising:

      i. A global fabric (fig. 1, element 102 – backbone). The fabric is the network used for routing messages between resources.

      ii. Two or more cluster nodes interconnected via the global fabric (fig. 1, elements 104, 106, 108).

      iii. Each cluster node including a node naming agent (NNA) (fig. 1, elements 110, 112, 114).

iv. A local fabric and one or more end nodes interconnected via the local fabric (fig. 1, elements 132, 120, 116).

v. The NNA being configured as a fully symmetrical translation device interposed between the local fabric and the global fabric (col. 4, lines 50-65).

vi. The NNA providing support for scaled clustering by transforming a local cluster address into a corresponding global cluster address for each packet in an outbound path from any of the cluster nodes by transforming a global cluster address into a corresponding local cluster address for each packet in an inbound path to any of the cluster nodes (col. 4, lines 50-65).

vii. Intra-node cluster addressing is transparent to the inter-node cluster address changes (col. 5, lines 55-65).

viii. Re-configuration of the scalable clustered system requires no address re-assignments yet allowing the end nodes in the cluster nodes to maintain connectivity therebetween (col. 5, lines 55-65; col. 6, lines 1-5).

Although the applicant teaches a clustered system operating with a fabric, the invention itself is regarding the node naming agent (NNA), which translates a network address, enabling a packet to be routed to its proper destination across a network. Thus, the invention merely substitutes a router with the NNA. By adding a level of indirection (referred to as

"hierarchical" by the applicant) to the problem of address assignment in a clustered computing environment, the applicant inherently or explicitly solves this problem. The invention will be treated as such from this point forward.

b. As to claim 2, Gervais discloses a scalable clustered system as in claim 1 wherein the local fabric and global fabric provide local and global clustering support infrastructures, respectively, and wherein global routing and global fabric topology are transparent to end nodes in operation (fig. 1; col. 9, lines 30-33).

c. As to claim 3, Gervais discloses a scalable clustered system as in claim 1 wherein the local and global fabric are each configured with one or more routers and/or switches (col. 6, lines 45-54).

d. As to claim 4, Gervais discloses a scalable clustered system as in claim 1 wherein each of the nodes is an addressable device representing a resource such as a microprocessor, a central processing unit (CPU), a memory, an input/output (I/O) device controller or a server (col. 1, lines 43-46).

e. As to claim 5, Gervais discloses a scalable clustered system as in claim 1, the re-configuration of which, by addition thereto or removal therefrom of any cluster node, is possible while maintaining the configuration of any of the other cluster nodes, and wherein configuration of any of the cluster nodes is possible without reconfiguration of any of the other cluster nodes

(col. 9, lines 30-39). By virtue of its transparency and by virtue of not requiring modification of the end nodes or the backbone, this feature is deemed inherent in Gervais.

f. As to claim 6, Gervais discloses a clustered system as in claim 1, wherein connections in the local and global fabric can be modified while maintaining correct packet transmission behavior (col. 9, lines 30-39). By virtue of its transparency and by virtue of not requiring modification of the end nodes or the backbone, this feature is deemed inherent in Gervais.

g. As to claim 7, Gervais discloses a scalable clustered system as in claim 1 wherein the number of end nodes in each cluster node corresponds to an attribute of address fields in packets (col. 4, lines 58-59 – "The address mapping gateway substitutes the 'globally-unique' domain network address and a 'domain-unique' gateway mapped node address for a network number and node address..." The term "node address" is defined as "node number" in col. 3, lines 12-13. Thus, it is understood that node address is also known as node number, which is stored somewhere in the address field).

h. As to claim 8, Gervais discloses a clustered system as in claim 1 wherein the NNA is configured to prevent a duplicated assignment of any end node address in establishing end node membership in a cluster node (col. 9, lines 60-65).

i. As to claim 9, Gervais discloses a clustered system as in claim 1 wherein the scalable clustered system has a hierarchical topology and wherein each of the cluster nodes has either a flat or hierarchical topology (fig 1, fig 3).

j. As to claim 10, Gervais discloses a clustered system as in claim 1 wherein local traffic of packets within any of the cluster nodes is not routed to its respective NNA. This feature is deemed inherent in Gervais due to the hierarchical layout of the routers. Packets meant for intra-domain (within a custer) nodes will be routed by routers within the domain.

k. As to claim 11, Gervais discloses a clustered system as in claim 1 wherein global traffic or packets to and from each of the cluster nodes is routed via its respective NNA (col. 8, lines 21-38).

l. As to claim 12, Gervais discloses a scalable clustered system as in claim 1 wherein the NNA includes a mask register for transforming the global/local cluster addresses in which bit substations can be made before an entire address has arrived at the NNA (abstract, lines 5-10 – it is understood that when a global address is translated into a local address, bit substitutions must take place, along with the mask register being used somewhere in the gateway disclosed by Gervais).

m. As to claim 13, Gervais discloses a clustered system as in claim 1 having hierarchical topology and address-identification scheme that relative to flat

non-hierarchical topology require smaller address fields and routing tables (col. 9, lines 19-23).

n. As to claim 21, Gervais discloses a clustered computer system as in claim 1 wherein the NNA includes data replacement register programmable with information for converting local cluster address to global cluster address and global cluster address to local cluster address (col. 4, lines 50-65). The address translator as disclosed by Gervais is implemented using a computer and as such are inherently programmable.

o. As to claim 23, it contains similar limitations to claim 1, except it discloses of establishing a cyclic redundancy check (CRC) value in an outbound packet CRC field based on whether a correct or incorrect CRC value is detected (col. 9, lines 14-19).

p. As to claim 24, it is rejected for similar reasons to claim 23.

q. As to claim 27, Gervais discloses a computer readable medium as in claim 26 wherein the computer program code is further configured to cause NNA to prevent assignment of a same local address to two end nodes in the same cluster node and associating an end node with more than one cluster node (col. 9, lines 61-3).

r. As to claims 29, 30, 31, they contain similar limitations to claim 1. In addition, claim 29 discloses a super-clustered system comprising a cluster within a cluster, which is also disclosed by Gervais (fig. 1, Domain 104

and 134 which is connected to backbone 102 by way of routers 110 and 114, where each router is performing address translation).

s. As to claim 38, it is rejected for similar reasons to claim 29.

t. As to claims 32 and 34, they are rejected for similar reason as claim 27.

u. As to claims 39 and 40, Gervais discloses a clustered and super-clustered system as in claim 29 and claim 1, wherein the local cluster address is a fixed (or local) cluster number of a cluster node (col. 4, lines 54-60 – the address mapping gateway replaces the globally-unique and domain-unique address for a network number and node address, respectively), and wherein the global cluster address is a cluster number assigned to the cluster node during cluster configuration (col. 7, lines 31-42 – explains the the addressing scheme. The network number, or the global cluster ID, must have been assigned a number somehow during domain, or cluster, configuration).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of U.S. Patent Number 5,991,817 to Rowett et al.

a. As to claim 14, Gervais teaches a clustered system as in claim 1 but fails to teach that the NNA is a semiconductor chip.

Rowett teaches a router that is integrated onto a single silicon chip (abstract, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Gervais to include the address translation and routing device that is implemented onto a single silicon chip because it eliminates bulky hardware (Rowett, col 1, lines 29-36).

b. As to claim 17, Gervais teaches a clustered system as in claim 1 but fails to teach a device having a mode control register, the contents of which determine which mode of operation the NNA assumes.

Rowett teaches a method and apparatus for a network router where certain components of the router have control enable bits, to which the router operates accordingly (col. 16, lines 19-21 and 26-30).

It would have been obvious to provide control enable bits to control certain features of the device and to render it into various modes of operation for reasons of configurability and flexibility. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention to modify the invention of Gervais to include the teaching of Rowett for the explicit reasons discussed herein above.

7. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of Rowett et al and U.S. Patent Number 6,636,498 to Leung.

a. As to claim 15, Gervais teaches a scalable clustered system as in claim 1 wherein the NNA has symmetrically built ends with one end being connected to the local fabric and the other end being connected to the global fabric but fails to teach that each end includes status indications and control enable bits.

Rowett teaches a method and apparatus for a network router where certain components of the router have control enable bits, to which the router operates accordingly (col. 16, lines 19-21 and 26-30) . Leung teaches a mobile IP mobile router that includes a status indicator indicating that that the network is active (col. 12, lines 50-58).

It would have been obvious to provide control enable bits to control certain features of the device. It would have also been obvious to provide status indications to clearly display and communicate router status. In addition to clearly conveying the status (of the mode in which the router is operating, for example), status indication is important for purposes of diagnosis during a problem. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the

invention of Gervais to include these features for the explicit reasons discussed herein above.

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of Rowett and Leung, as applied to claim 15 above, and further in view of U.S. Patent No. 6,389,023 to Matsuzawa.

a. As to claim 16, Gervais teaches a scalable clustered system as in claim 15 but fails to teach the control enable bits, in which the said control enable bits include a shutdown on missing clock enable, a replace source address enable, a replace destination address enable, a destination address checking enable and a pass-through enable.

As discussed in claim 15, the modification of Gervais to include control enable bits discussed in Rowett teaches control enable bits to control certain features of the device. Matsuzawa discloses a router apparatus where it checks the destination MAC address (col. 14, lines 5-7). Gervais discloses a network address translation device that replaces source and destination address (col. 7, lines 55-56).

It would have been obvious to include source and destination address replacement and destination address checking mode to the modified invention as discussed in claim 15, as various options and different modes of operation endow the device with customizability. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Gervais, Rowett and

Leung to include these features for the explicit reasons discussed herein above.

9. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of Rowett, as applied to claim 17 above, and further in view of U.S. Patent No. 6,577,634 to Tsukakoshi et al, and U.S. Patent No. 6,078,963 to Civanlar et al.

a. As to claim 18, the combined teaching of Gervais and Rowett teaches a scalable clustered system as in claim 17, but fails to teach that the NNA's mode of operation include a pass-through mode, a conversion mode, and an error check mode but fails to include an error recovery mode and a shutdown mode.

Tsukakoshi teaches a highly-expandable router configuration technology where the routers may go into shutdown mode by automatically powering itself off (col. 5, lines 14-20). Civanlar teaches a network router having a plurality of intelligent router ports where functions include data error detection, and/or data error recovery (col. 7, lines 52-54). Rowett teaches a method and apparatus for a network router where certain components of the router have control enable bits, to which the router operates accordingly (col. 16, lines 19-21 and 26-30). And conversion mode is the default mode in which Gervais' device operates.

It would have been obvious to combine the teaching of Gervais with the teaching of Rowett to enable the device to have various modes of

operation. It would have been obvious to further modify the combined teaching of Gervais and Rowett to include shutdown mode taught by sukakoshi and error detection and recovery mode taught by Civanlar. Error detection and error recovery are important features of an address translation device where fault-tolerance and high availability are paramount to its functionality. The ability to shut down when problems arise (when error has been detected and there is no way to recover from the problem, for example) goes in tandem with error detection and recovery. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Gervais and Rowett with the teaching of Tsukakoshi and Civanlar for the explicit reasons discussed herein above.

b. As to claim 20, the combined teaching of Gervais, Rowett, Tsukakoshi and Civanlar teaches a scalable clustered system as in claim 18, but does not teach that the default mode of the NNA upon initialization is the pass-through mode. In pass-through mode, all the features of the device are disabled, where packets are sent to the ports unchanged. This is essentially how a hub operates, which indiscriminately forwards packets in unmodified form to all ports. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combined invention of Gervais, Rowett, Tsukakoshi and Civanlar to include the pass-through mode as the default mode of initialization

because the device must first discover information about the computers in the network or cluster in order to start address translation.

10. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of Rowett and Matsuzawa.

a. As to claim 19, the combined teaching of Gervais, Rowett and Matsuzawa teaches a scalable clustered system as in claim 1 but fails to teach that, while in conversion mode, the NNA is configured to perform source and destination clustered identification (ID) translation and destination address checking.

Gervais' normal mode of operation performs destination address translation. It would have been obvious to include the control enable bits of Rowett to put it into various modes of operation. And it would have been obvious to include Matsuzawa's destination address checking to the invention of Gervais to minimize errors and to ensure that the packets are delivered to their proper destination. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Gervais and Rowett to include the feature taught by Matsuzawa for the explicit reasons discussed herein above.

11. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of U.S. Patent Number 6,779,039 to Bommareddy et al.

a. As to claim 25, Gervais discloses a method as in claim 24 but does disclose of verifying proper routing by checking a destination cluster ID field in an inbound packet.

Bommareddy discloses a router clustering system where the destination IP address is checked to determine whether the destination IP address is a cluster address (col. 8, lines 35-38).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the combination of Gervais to include the feature taught by Bommareddy because destination address checking minimizes errors and ensures that the packets are delivered to their proper destination cluster.

12. Claims 33, 35, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gervais in view of what was well known in the art at the time the invention was made.

a. As to claims 33, 35 and 37, Gervais discloses a scalable clustered system operating in an IPX network. However, TCP/IP is ubiquitous and well known in the art. It is the de facto standard for transmitting data over the networks. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the invention of Gervais to enable it to operate in a TCP/IP network because TCP/IP is the de facto standard for transmitting data over networks.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent No. 5,640,399 to Rostoker et al disclose a single chip router for a multiplex communication network.

b. U.S. Patent No. 6,151,688 to Wipfel et al disclose methods, systems and devices to manage resources in a computing cluster. The managed resources include cluster nodes themselves, as well as resources such as memory buffers and bandwidth credits that may be used by one or more nodes.

c. U.S. Patent No. 6,608,830 to Hirano et al disclose a router carrying out address translation of addresses added to the packets between private addresses and global addresses.

d. U.S. Patent No. 6,769,008 to Kumar et al disclose techniques for dynamically altering configuration of clustered computing systems. The techniques can be implemented to allow alteration of an existing configuration of a clustered computing system without having to completely shutdown the clustered computing system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Min S. Kwon whose telephone number is (571) 272-7216. The examiner can normally be reached on 8 AM - 4:30 PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack B. Harvey can be reached on (571) 272-3896. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THONG VU